Upper Middle Fork John Day River Intensively Monitored Watershed

Interim Summary Report

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Contents

Number of years of pre-treatment fish and habitat data collections and the habitat protocols used (ie. PIBO, AREMP EMAP, CHAMPS, ODFW, TFW, and others). 3

A description of whether the locations where habitat transects are being measured are also being measured for salmonid densities. 4

Number of years of completed habitat restoration treatments and the percentage of habitat restorations completed compared to the number estimated to be needed to be able to detect changes in fish abundance. 6

A summary of fish abundance trends (adult spawners and juvenile migrants) for target species since the project began and whether they correlate with habitat improvements. 7

A summary of the results to date of any PIT tagging, radio tagging, or acoustic tagging underway. 9

A summary of other habitat disturbances in the watershed that may be obscuring the IMW results. 10

A list of partners who are cooperating to either monitor the IMW for fish or habitat or to place projects in the IMW. A description of their funding source if known. 11

A summary of threats or obstacles, if any, to the successful completion of the IMW. 11

Date when the IMW was estimated to be able to provide results. 12

Figure 1. Middle Fork IMW Study area and salmonid surveys 5
Figure 2. Summer steelhead escapement estimates 7
Figure 3. Estimated survival probability from tagging 9
Figure 4 Survival probabilities for juvenile Chinook at five sites in the MF IMW 10

Table 1. Fish and habitat data collection activities, protocols, and years conducted. 4
Table 2. Middle Fork John Day River summer steelhead smolts/spawner estimates 8
Table 3. Middle Fork John Day River spring Chinook smolt/redd ratios estimates 8

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Number of years of pre-treatment fish and habitat data collections and the habitat protocols used (ie. PIBO, AREMP EMAP, CHAMPS, ODFW, TFW, and others).

The initiation of the Upper Middle Fork John Day Intensively Monitored Watershed (IMW) occurred in 2007 with additional monitoring programs added in 2008. All of the restoration projects that have been implemented since that time have at least one year of pre-treatment data for either fish or habitat and some have additional years of pre-treatment data. The IMW study design established control reaches as well as a control watershed, in the South Fork John Day River.

Information about previous monitoring work conducted before the IMW began is described and in Table 1. The IMW is intending to use this information to further establish pre-treatment conditions in the watershed.

Annual index redd surveys for spring Chinook salmon started on selected reference streams within the IMW study area in 1967 and annual census surveys for spring Chinook redds began in 2000. A continuous habitat survey using ODFW Aquatic Inventories Project methods was conducted along the mainstem Middle Fork John Day River during the summer of 1996 and again in 2004. Annual smolt abundance estimates for spring Chinook and summer steelhead from the operation of the rotary screw trap at Ritter began in 2002. This effort combined with annual redd counts enabled productivity estimates (smolts/redd) by Chinook brood years beginning in 2002. In 2004, summer steelhead redd surveys began as part of the John Day Major Population Group MPG. Productivity estimates for steelhead began when IMW steelhead redd surveys were initiated in 2008.

Table 1. Fish and habitat data collection activities, protocols, and years conducted.

Activity	Protocol	Years					
Aquatic Inventories Project	ODFW (Moore, K 2007)	1990	1992	1995	1996	1997	2004
Oregon Plan Habitat Surveys	ODFW (Moore, K 2007)	2004	2005	2006	2007		
PIBO		2008					
Fish Cover	EMAP	2008	2009	2010	2011		
Distributed Temperature Sensing		2008	2009	2010	2011		
Stream Temperature		2008	2009	2010	2011		
Groundwater		2008	2009	2010	2011		
Channel geomorphology	USFSGTR-RM-245; RMRS-GTR-74	2008	2009	2010	2011		
Snorkel Surveys		2008	2009	2010			
Fish Population Surveys		2007	2008	2009	2010	2011	
CHAMP	CHAMP 2011	2011					

A description of whether the locations where habitat transects are being measured are also being measured for salmonid densities.

The majority of the IMW habitat survey locations are complemented by four salmonid measuring techniques.

1. POPAN model juvenile survival monitoring
2. Parr to Smolt Monitoring (PIT Tags and Mark Recapture Models)
3. Redd counts
4. Seasonal parr rearing / presence absence surveys.

A more precise depiction of habitat transects and the locations for salmonid density measurements can be found in Figure 1.

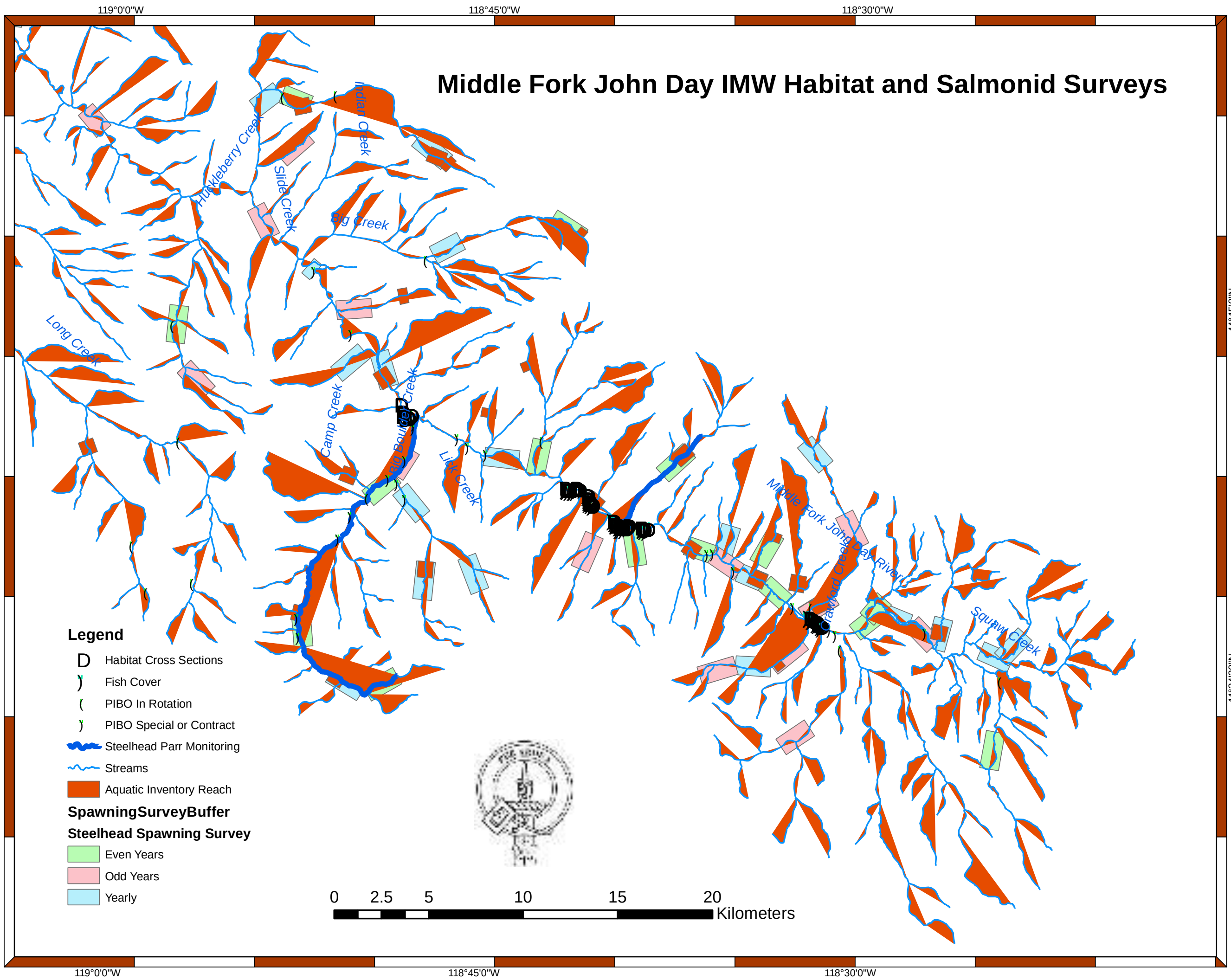

Figure 1. Middle Fork IMW Study area and salmonid surveys

Number of years of completed habitat restoration treatments and the percentage of habitat restorations completed compared to the number estimated to be needed to be able to detect changes in fish abundance.

There are 290 implemented restoration actions located on the Middle Fork John Day River IMW study area. These treatments span several years of implementation; 2000-2010. Some of the 290 actions are individual treatment locations such as riprap removal or large wood placement. The mainstem Middle Fork John Day is undergoing substantial channel reconfiguration efforts. In the upper treatment reach, 20 engineered logjams and 32 riprap barbs were removed, in just the last few years. In the middle treatment reach, one project installed 18 engineered logjams and removed 34 riprap barbs. This treatment reach went also went through Phase I of a major channel realignment project. The first phase installed 15 large woody debris structures and various point bar and floodplain tree placement. Further phases will remove the north channel of a bifurcated section of the river, engineer new meandering channel on the south channel, add habitat structures, and lengthen one tributary and install habitat structures.

The lower treatment reach had two major channel realignments that placed the river into historic channels, redeveloped meanders and installed engineered logjams. Channel realignment projects account for over 8 km of realigned mainstem river channel in the IMW study area. There are roughly 200 projects in tributaries that are mostly comprised of fish screen installations and improvements to fish passage barriers.

OWEB is continuing to invest strategically in the Middle Fork John Day River to complete high priority restoration projects and actions called for in recovery planning efforts through the grant program administered by OWEB. Currently, there is an increase in coordination of the Middle Fork Working Group members formed around the central idea of identifying and prioritizing high ecological value restoration projects from a multi-agency viewpoint. The IMW will continue to engage in this process to ensure the best possible outcome from restoration in a long-term monitoring study design.

A summary of fish abundance trends (adult spawners and juvenile migrants) for target species since the project began and whether they correlate with habitat improvements.

Adult steelhead escapement has ranged from 769 in 2008 to 3,692 in 2011 within the study area (Figure 2). In the South Fork John Day River (SFJDR), a control watershed, escapement has ranged from 432 in 2010 to 1,833 in 2009 (Figure 2).

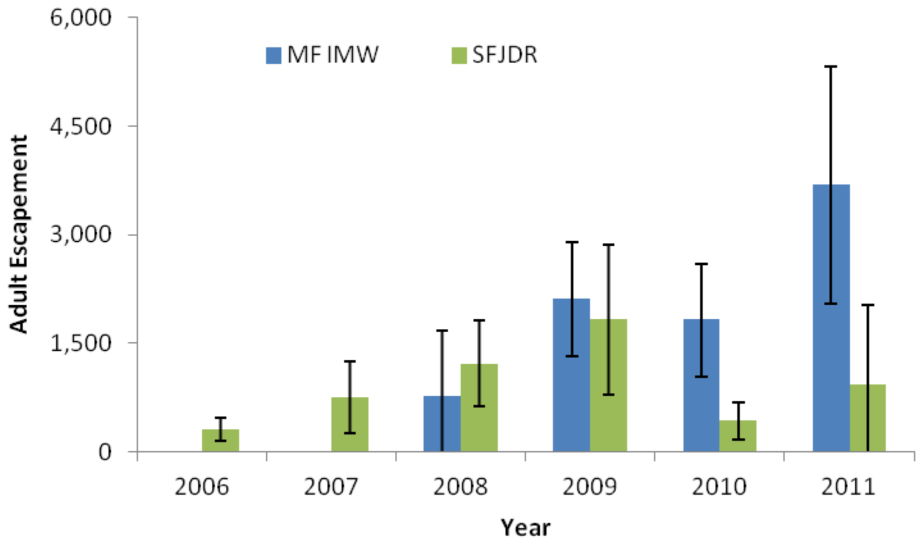

Figure 2. Summer steelhead escapement estimates for the Middle Fork Intensively Monitored Watershed (MF IMW) and the South Fork John Day River population (SFJDR) from 2008 to 2011. Error bars represent 95% CI.

Preliminary estimates of summer steelhead smolts per spawner from the study area are incomplete. However, they are comparable to estimates for the South Fork John Day River for the 2008 and 2009 brood years (Table 2). Estimates for BY2008 steelhead offspring should be complete at the end of migratory year 2012 with BY2009 following in 2013. Although results for adult steelhead escapement look promising, additional years of study are needed to determine a statistically significant increase in summer steelhead production.

Table 2. Middle Fork John Day River summer steelhead smolts/spawner estimates based on smolt abundance estimate from rotary screw trap and escapement estimates from the Middle Fork Intensively Monitored Watershed (James et al 2010) and the South Fork John Day R

Brood Year		Escapement	Smolt Estimate	Smolts/Spawner	95% CI	
2006	MFJDR	n/a	n/a	n/a	n/a	
	SFJDR	309	22,030	71	43	167
2007	MFJDR	n/a	n/a	n/a	n/a	
	SFJDR	756	34,064	45	24	151
2008	MFJDR	769	26,594[a]	35[a]	13	-*
	SFJDR	1,224	33,573[a]	27[a]	16	60
2009	MFJDR	2,114	13,629[b]	6[b]	3	16
	SFJDR	1,833	34,662[b]	19[b]	11	49

[a] Preliminary estimate possible age-4 smolts not included.
[b] Preliminary estimate age-3 and age-4 smolts not included.

Spring Chinook redd counts in the MFJDR ranged from 85 in 2007 to 505 in 2011 (Table 3). Smolts per redd estimates for the MFJDR have ranged from a low of 15 for BY2008 to a high of 453 for BY2007 (Table 3).

Table 3. Middle Fork John Day River smolt/redd ratios based on estimates of smolt abundance and census redd counts for spring Chinook salmon, 2002–2009 brood years.

Brood Year	Number of redds	Migration Year	Trapping period	Smolt abundance	95% CI	Smolt/redd	95% CI
2002	389	2004	10/29/03–6/23/04	23,901	19,449-30,188	61	50-78
2003	236	2005	10/6/04–6/17/05	21,957	18,747-25489	93	79-108
2004	319	2006	3/6/06–6/22/06	18,465	14,423-24,186	58	75-76
2005	178	2007	10/31/06–6/14/07	16,901	14,279-20,755	95	80-117
2006	199	2008	2/12/08–6/20/08	7,382	5,553-9,990	37	28-50
2007	85	2009	9/29/08–6/18/09	38,519	34,191–43,658	453	402–513
2008	169	2010	10/7/09 – 6/25/10	35,712	33,413–38,333	211	198–227
2009	251	2011	9/28/10 – 6/3/11	21,322	17,906 – 26,217	85	71 - 104
2010	193	2012					
2011	505	2013					

A summary of the results to date of any PIT tagging, radio tagging, or acoustic tagging underway.

Except for brood year (BY) 2007, differences in survival among summer and fall PIT tagged juvenile Chinook salmon in the study area generally occur during the summer freshwater rearing stage (Figure 3). Survival estimates in the migratory corridor beyond the rotary screw trap range from 60% to 75% for juvenile Chinook and are consistent between the two tagging groups.

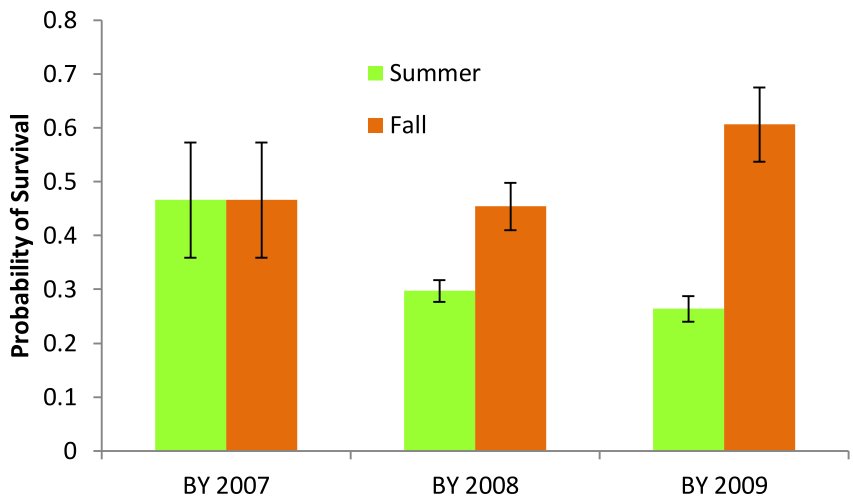

Figure 3 Estimated survival probability from tagging to the rotary screw trap for juvenile Chinook tagged as parr in the MF IMW during the summer or fall, for brood years 2007 to 2009. Error bars represent ±SE.

Results from open population modeling of over-summer survival for juvenile Chinook and steelhead during the 2011 field season are unreliable for some sites. More information over the coming years will provide statistics that are more reliable. Approximately 50% of the sites monitored this year, had non-estimable parameters for one or more parameters in the model. None of the tributary sites monitored (Coyote Cr., Vinegar Cr. Lower, Vinegar Cr. Upper, and Deerhorn Cr.) had *good model fit* for juvenile Chinook data, but two of the tributary sites did have *good model fit* for juvenile steelhead. Further assessment of the data showed some sites had insufficient data points for model estimation (i.e. most tributary sites) while others showed violations of model assumptions, mainly equal survival probability for marked versus unmarked fish. This does not necessarily equate to marked fish actually having different survival rates, but could be a result of different rates of permanent *emigration* and *immigration* for marked and unmarked fish, respectively. For sites where the data were successfully fit to models, varying results in survival occurred for juvenile Chinook. Survival varied from a low of 23.5% at Mid-Control 2 during the early August to late August interval to 91% at the Lower Control site during the late August to late September interval (Figure 4). For juvenile summer steelhead in Upper Vinegar Creek, probability of survival increased throughout the summer from 46% to 92%, while remaining constant in Coyote Creek (71.5%; Figure 4).

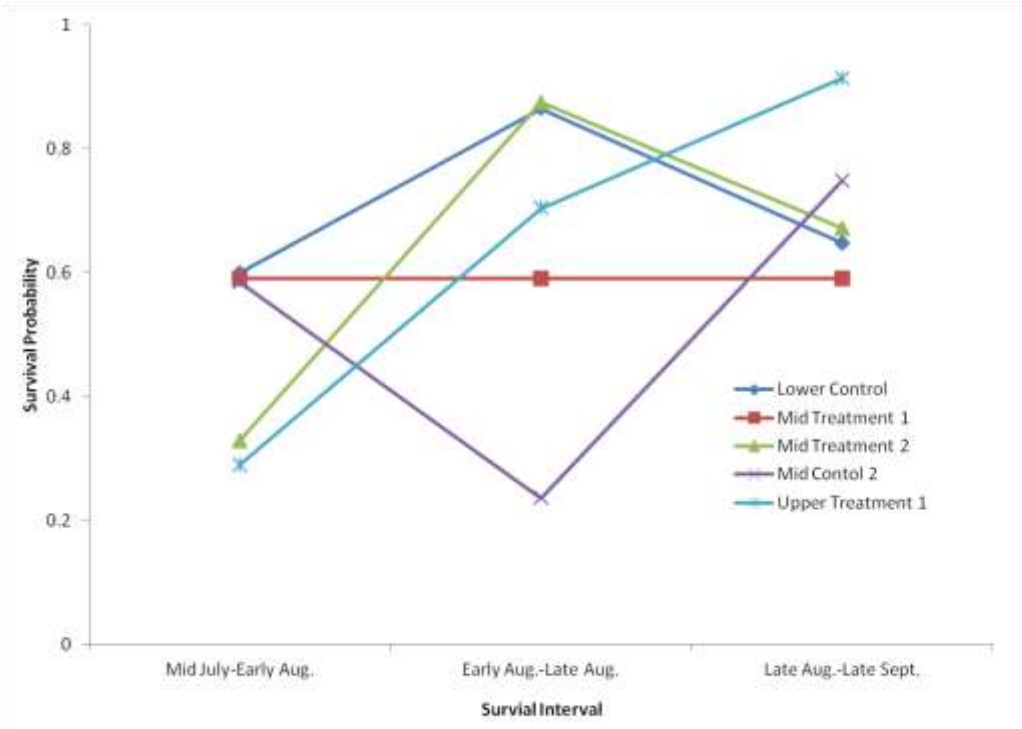

Figure 4 Survival probabilities for juvenile Chinook at five sites in the MF IMW between sampling intervals during the 2011 field season. Note: The best fit model for Mid Treatment 1 had constant survival over the three intervals.

Juvenile steelhead abundance estimates from closed capture modeling at four sites in the MF IMW, Camp Creek (n=3) and Granite Boulder Creek (n=1), all show an increasing trend in juvenile abundance from the Summer of 2008 to the Fall of 2011 (Figure 4). Given the complexity of steelhead life history, multiple years of data are needed to begin modeling fresh water parr to smolt survival rates at these sites. We currently are in the process of preparing the data to start running survival models on tagging cohorts from the 2008 field season.

A summary of other habitat disturbances in the watershed that may be obscuring the IMW results.

A significant flood event in spring 2011 has potential to mask fish productivity for the next few years. It was the largest flood on record in the Middle Fork John Day River and it occurred during the period when spring Chinook fry may have been emerging. Due to the relative inability of fry to swim, there is a good chance that many spring Chinook that were present were swept away. ODFW is continuing to look into this possibility and we should have more information in the near future.

In 2007, an exceptionally hot summer combined with low flows produced conditions that caused a significant fish kill in the mainstem Middle Fork John Day River. ODFW has produced a report on spring Chinook pre-spawn mortality surveys (Schricker et al. 2007). Recent evidence suggests that this had little influence on adult returns from this brood year likely because these progeny encountered favorable survival conditions in the ocean.

Bates Pond poses a potential major disturbance event and information is being gathered from a sediment release that occurred in early 2011. In addition, the pond has the potential to raise summer stream temperatures and constitutes a major fish barrier during critical times of the year when salmonids are looking for cooler tributary habitat that is located upstream from the pond.

A list of partners who are cooperating to either monitor the IMW for fish or habitat or to place projects in the IMW. A description of their funding source if known.

Bonneville Power Administration, Bureau of Reclamation, Confederated Tribes of the Warm Springs Reservation of Oregon, Oregon Department of Fish and Wildlife, United State Forest Service (Malheur District, PIBO team), Oregon State University, University of Oregon, The Nature Conservancy, The Freshwater Trust, North Fork John Day Watershed Council, Oregon Department of Environmental Quality, Oregon Parks and Recreation Department, Natural Resources Conservation Service, Oregon Watershed Enhancement Board and private landowners.

A summary of threats or obstacles, if any, to the successful completion of the IMW.

Some groups are having considerable issues with litigation concerning grazing allotments. This does not directly affect the overall success of IMW but does affect their ability to engage with IMW.

Permitted take of juvenile steelhead is set prior to the field season and underestimation of the number of fish to be handled commonly occurs. The monitoring protocol and data analysis techniques used requires all fish captured at our monitoring sites to be tagged for individual identification. With the expansion of juvenile Chinook monitoring in 2011, adjustments were made to avoid capture of juvenile steelhead. However, future take levels will need to be adjusted to accommodate this additional effort and provide some level of certainty to complete monitoring without sampling adjustments.

The most direct issue that the IMW faces is funding uncertainty. Problems stem from the irregular grant award dates and their general incompatibility with planning for field seasons. (i.e. ODFW must have field staff hired by March to sample for steelhead. Without a signed agreement, they cannot begin the hiring process). The other aspect on the funding situation is variability of the award amount. The recent reduction to the IMW stresses projects whose funds are spread very thin. The MFIMW has secured monies from OWEB this year to fill in the gaps but this funding is in all likelihood a one-time addition.

Date when the IMW was estimated to be able to provide results.

2017. In 2007, when the IMW was developed the study acknowledged that at least 10 years would be required to start to develop an understanding for fish abundance and correlations to restoration project implementation. This number of years approximates two complete life cycles for spring Chinook and summer steelhead. One approach to this question is based on the design of the IMW itself and results from future fish production and abundance should help answer this question more fully.

References

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